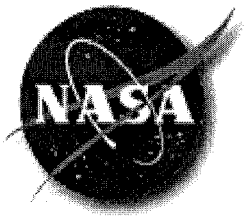


National Aeronautics and
Space Administration

MSFC-PLAN-3101
Baseline
August 2000

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

FD31

Multi-use Payload Group

Pressurized Payloads Team Risk Management Plan

CHECK THE MASTER LIST—
VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

MSFC - Form 454 (Rev. October 1992)

Enclosure 7

Multi-use Payload Group FD31		
Title: Pressurized Payloads Team Risk Management Plan	Document No.: MSFC-PLAN-3101	Revision: Baseline
	Effective Date: August 2000	Page 1 of 17

FD31/Paul A. Gilbert

Paul A. Gilbert 8-2-00

Prepared by: Date

Pressurized Payloads Team Lead

FD31/Teresa B. Vanhooser

Teresa B. Vanhooser 8-2-00

Supervised by: Date

Multi-use Payloads Group Lead

DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		September 00	Replaces the Pressurized Payloads Team interim risk plan ERO-QR-4, dated March 2000

5-3-01 RELEASE

1.0 INTRODUCTION

This plan documents the practice of risk management as tailored to the Pressurized Payloads Team (PPT) in the Multiuse Payload Group/FD31 at Marshall Space Flight Center (MSFC).

As used herein, "risk" refers to anything which can prevent a team from meeting its commitments. All forms of risk shall be managed, including technical, cost, and schedule risks.

1.1 Purpose and Scope

This plan will define the process of risk management as it is performed within the PPT Projects.

This document does not address risk management within the host Program.

Individual PPT project plans will define the overall activities of the projects. This Risk Management Plan is subordinate to the individual PPT project plans.

The identification , characterization, mitigation plan, and mitigation responsibilities associated with specific risks are contained in the PPT Risk Management Database (PRMD) and specific risk abatement or contingency plan documents, as required.

2.0 APPLICABLE DOCUMENTS

TABLE 2.0-1 APPLICABLE DOCUMENTS

Document Number	Description
NPG 7120.5	Program/Project Management
MPD 1280.1	Marshall Management Manual
MSFC-PLAN-3023	Multiuse Payloads Group Data Management and Records Management Plan
SSP 50175	ISS Program Risk Data Management System

3.0 DEFINITIONS/ACRONYMS

TABLE 3.0-1 DEFINITIONS/ACRONYMS

3.1 PPT. Pressurized Payloads Team

3.2 PRMD. Pressurized Payloads Team Risk Management Database

3.3 Risk. As used herein, "risk" refers to anything which can prevent a team from meeting its commitments. All forms of risk shall be managed, including technical, cost, and schedule risks. In the existing PPT project nomenclature, a risk may be called an issue, threat, or lien.

3.4 Risk Summary Card A card which contains a matrix and instructions used to rank risks in regard to project impacts and probability of occurrence

3.5 SSPO. Space Station Payloads Office

4.0 PPT RISK MANAGEMENT PROCESS

4.1 Overview

This section provides an overview of the risk management process and its relation to PPT's projects and managers.

In the existing PPT project nomenclature, a risk may be called an issue, threat, or lien. The identification of a risk may be made by either the PPT Project personnel or the contractor. Those risks which are determined by the PPT Team Lead and Space Station Payloads Office (SSPO) Manager to present large cost/schedule/technical risk, are elevated and submitted into the ISS Program Risk Data Management System (SSP 50175).

There are five primary activities performed in the PPT risk management process:

- identification of risks: a continuous effort to identify and document risks as they are found
- analysis of risks: an estimation of the impacts

- planning risks: decision about what to do with the risks, which, for major/complex risks, will include mitigation plans
- classification into sets of related risks, and prioritization of risks relative to each other inside a project
- tracking and controlling risks: collection and reporting status information about risks and their mitigation plans (where appropriate) and taking corrective action as needed.

The risk management activities will be carried out during day-to-day activities of project personnel as well as during key project meetings.

5.0 ORGANIZATION

5.1 Project Organization

The PPT project organizations and interfaces will be shown in the unique Project Plans as they are developed or updated.

5.2 Project Communication and Responsibilities

The responsibilities of the contractor team, the systems engineer, the PPT project manager, and the PPT Team Lead, are specified in the following Table 5.2-1 and illustrated in Figure 5.2-1

TABLE 5.2-1 PROJECT RESPONSIBILITIES FOR RISK MANAGEMENT

Who	Responsibilities
Contractor	Identify new issues, threats, liens Recommend approach and actions Track issues and mitigation plans Implement mitigation plans (Contractor format for identification is acceptable)
PPT Systems Engineer	Identify new risks Work with the contractor/NASA team to select best approach for mitigation Obtain support of NASA specialists as needed to assist in the risk assessment/mitigation
PPT Project Mgr.,	Identify new risks Make control decisions (analyze, decide, execute) in conjunction with contractor and PPT Systems Engineer Authorize expenditure of resources (within budget allocations) for mitigation or submit request for additional resources Communicate with the PPT Team Lead
PPT Team Lead	Identify new risks Elevate significant issues to Space Station Payloads Office (SSPO) For issues elevated into an ISS Risk, reviews general risk management measures/metrics monthly with the SSPO, ensures risks are updated

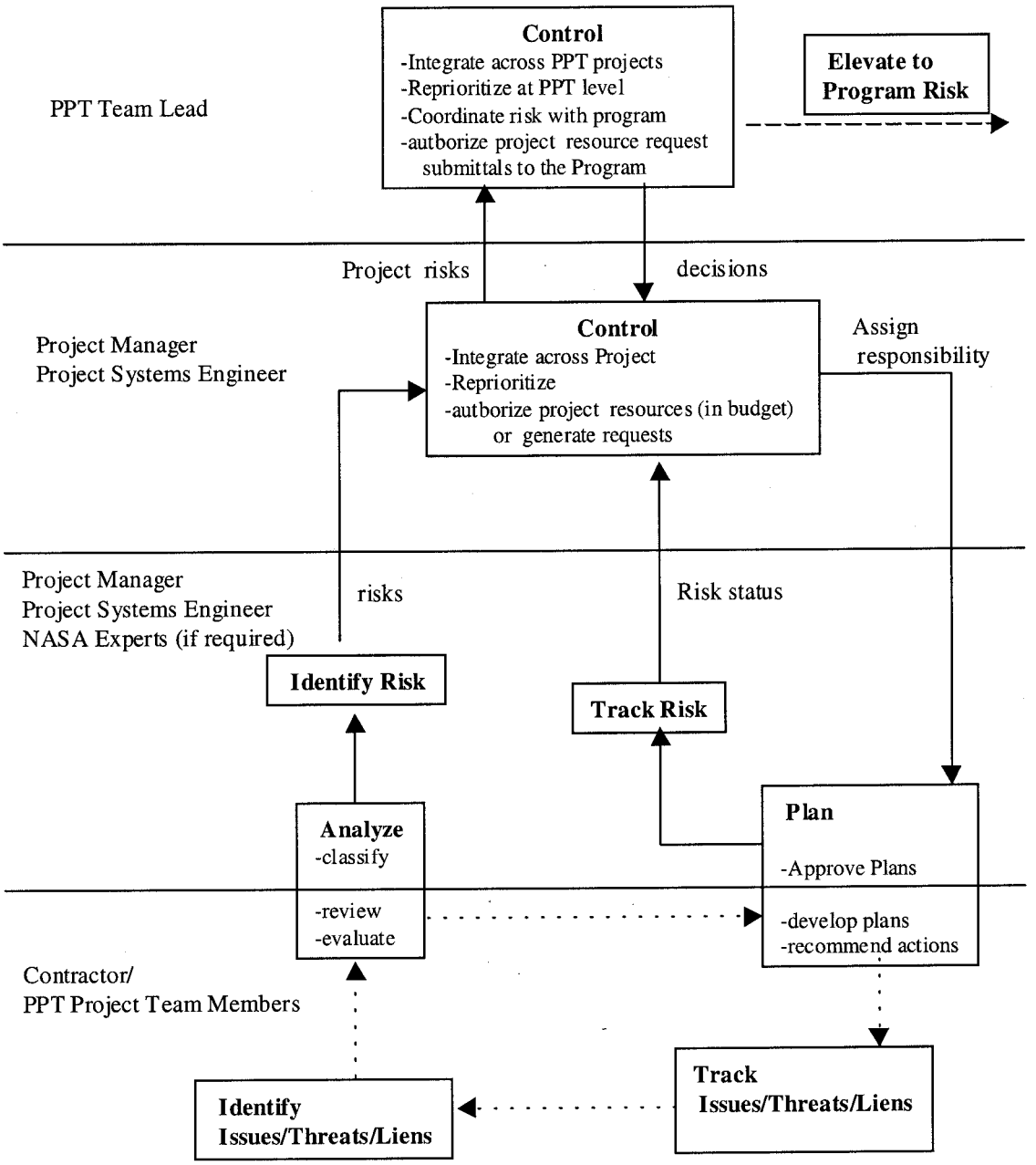


FIGURE 5.2-1 RISK COMMUNICATION FLOW CHART

5.3 SSPO Program Responsibilities

When issues that significantly affect the associated Program or project are identified, it is the responsibility of the PPT Team Lead to notify the appropriate SSPO Manager. The SSPO Manager, with the assistance of the PPT Team Lead, is responsible to manage issues elevated into the ISS Program level Risk Management Database.

The SSPO manager shall be responsible for reporting risk status to the Program. The SSPO Manager is responsible for the authorization of additional program funds as appropriate to mitigate or eliminate the risk.

5.4 Contractor Responsibilities

The Contractor for the PPT projects has primary responsibility for identification of potential project risks in the form of threats, issues, liens, or risks. These may be identified to the PPT Project Manager through the use of existing: contractor reports; in-house presentations, or telecons, attended by the NASA project counterparts; as well as monthly meetings held between NASA and the contractor. The contractor has responsibility for the tracking of threats, issues, liens, or risks inside their organization.

Additionally, for activities within the scope of the contract, the contractor has the primary responsibility for development and implementation of mitigation plans, action lists, etc.

6.0 PROCESS DETAILS

This section provides the details about the process needed to enable project personnel to carry out the risk management activities.

6.1 Establishing Baselines and Reestablishing Baselines

A baseline set of risks will be established on PPT projects prior to the first major design review milestone (PDR or IPR etc.) for the project (for projects initiated after Revision A release of this document). The baseline shall be updated or re-established periodically at major project milestones, as defined in the applicable project plan. Risk baseline or re-establishment is conducted using the following process.

Step	Action
1	PPT Project Manager and Project System Engineer identifies an experienced group of engineering and project personnel (NASA and/or contractor).
2	The group uses an open interview method to update or generate risks in a two-hour session.
3	Group evaluates risks using the PPT Risk Summary Card (See Appendix A)
4	PPT Project Manager and Project System Engineer prioritize the risks or sets of risks and determines which risks should be transferred, delegated, watched, accepted, mitigation plans developed, or researched
5	PPT Project Manager assigns risks to the contractor or other personnel to be building mitigation plans as required
6	Risks are updated or added to the PPT Risk database

6.2 Identifying risks

All PPT personnel are responsible for identifying new risks. Each project will be reviewed whenever any predefined thresholds or triggers are reached that would indicate a potential problem, as defined in the project plan.

The PPT Risk database can be accessed by anyone in the PPT at any time to identify new risks. The project data shall be reviewed once per month by PPT personnel. Risk statements and information will provided per Appendix A. All relevant information shall be captured. The risk will be assigned a risk identifier based upon the project acronym. The risk may be entered directly into the database by the responsible Project Manager and/or System Engineer.

Any new risks identified during any project-related meeting shall be added to the database within 5 working days of the meeting. It is the responsibility of the Project Manager to make sure that this is accomplished.

Any risk which is accepted as is and may effect flight safety will be forwarded to the project safety engineer for inclusion in the project safety data package.

6.3 Attributes and Criteria for Project Risks

Risks shall be assigned attributes based on values specified in the PPT risk summary card as shown in Appendix A.

6.4 Analyzing risks

Assessment of impact shall be estimated by the identifier of a risk, and discussed when item is presented. If the identifier does not know the immediate potential for full impact, the risk may be monitored and the impacts provided at a later date.

Risks may be removed at the discretion of the PPT Team lead or Project Manager when sufficient mitigation has occurred to reduce or remove the risk, or the SSPO Manager has provided funding to cover project cost threats.

6.5 Planning risks

All risks shall be assigned to someone within the project for responsibility (NASA personnel or contractor). Accomplishment of actions contributing to the mitigation of the risk will also be assigned. Responsibility for a risk means that the responsible person must answer for the status and mitigation of the risk.

In addition they are required to: 1) Decide if the risk requires further research (then create a research plan); 2) accept the risk (document acceptance rationale in the database or per a white paper, and close the risk),; 3) track the risk to closure, or mitigate the risk (create a mitigation plan, assign actions, and monitor the plan and the risk).

Mitigation plans may be an action item list, bubble chart, or a detailed task plan. The project manager shall determine when to use a task plan format.

In general, actions contributing to the mitigation of the risk are implemented by the contractor. The PPT project manager and system engineer are responsible to monitor the contractor for proper mitigation planning and implementation at a level appropriate with severity of the risk.

Mitigation plans for complex risks shall be either an action item list, bubble plan, or detailed plan (cost, schedule, metrics etc.). The PPT project manager and implementing contractor shall determine which format is required based upon their assessment of the complexity and criticality of the risk to the project.

The Project manager shall determine whether or not to keep the risk, delegate responsibility, or transfer responsibility. For risks found to generically affect PPT project hardware, the project manager can coordinate transfer of the risk to the PPT Team Lead.

The planning decision process is shown in Figure 6.5-1

6.6 Tracking and Control of risks

The PPT Project Manager may provide routine status on risks to during the standard weekly, monthly, project/department/directorate/program meetings.

A monthly PPT Team risk meeting will be held, to evaluate and coordinate risks among the PPT projects. Status on all risks will be reported during the monthly meetings .

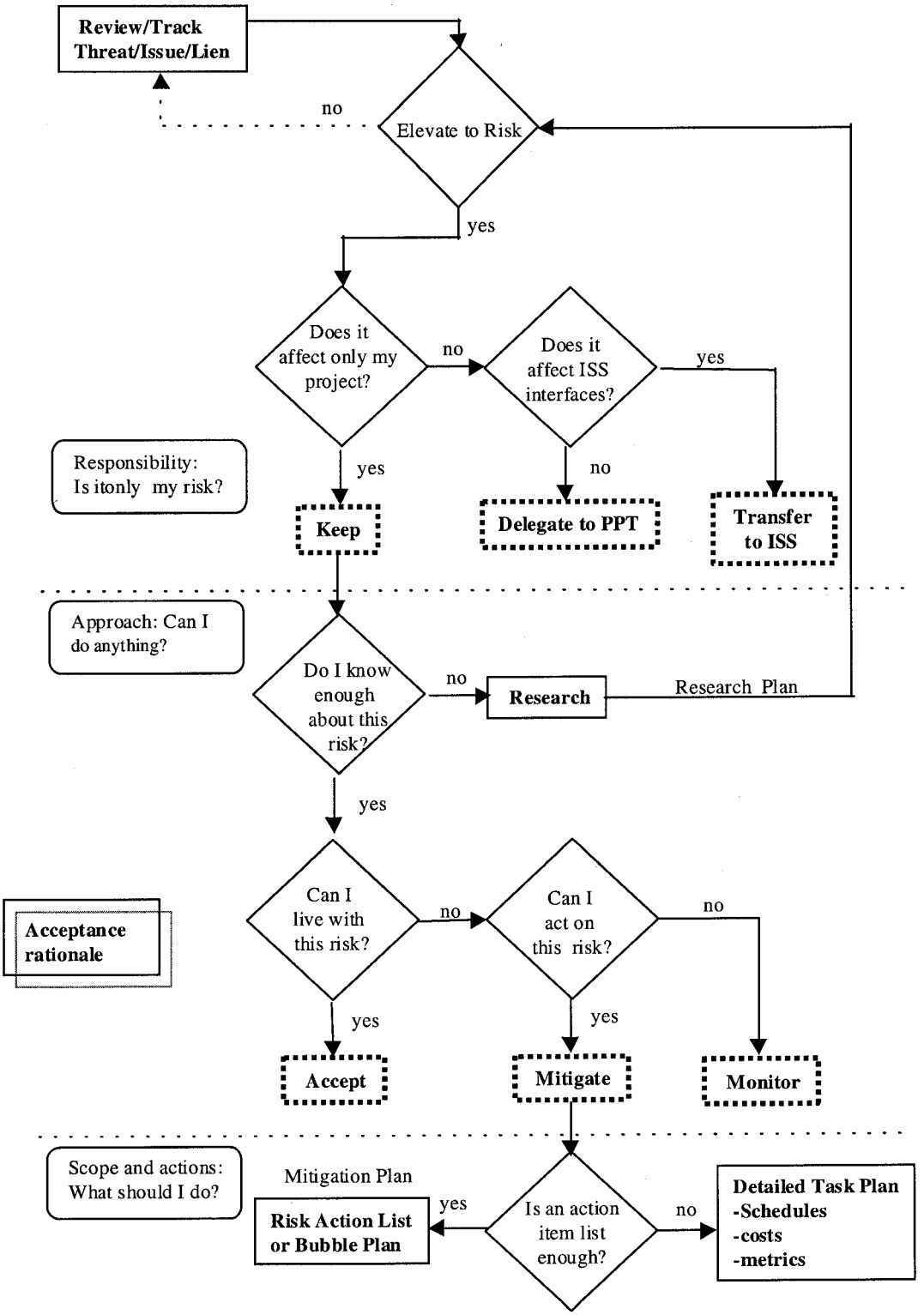


FIGURE 6.5-1 PLANNING DECISION FLOW CHART

TABLE 6.5-1 SUMMARY OF METHODS AND TOOLS

Method or Tool	Use:
Risk Summary Card	Used as a guide to rank risks for probability of occurrence and consequence
Bubble Plan or Action List	Used for developing mitigation plans for complex risks.
Periodic review of project data and project status presentations	Used for routine or frequent identification of risks. Serves as a constant reminder of open risks.
PPT Risk Database	Used to track and report risks within the PPT
Monthly PPT Risk Review	Used by the PPT Team Lead and project managers to status and assess risk and to evaluate commonality

7.0 RESOURCES FOR RISK MANAGEMENT

In general, additional resources required for the mitigation of risks are held at the ISS Program level.

Any requirements for additional mitigation resources must be approved by the Project Manager, and typically requires SSPO Manager approval.

8.0 DOCUMENTATION OF RISK INFORMATION

Threat, issue, or lien reporting from the contractor will be accomplished as much as practical using the contractor's existing work processes, documentation, and formats.

Within the PPT organization, the threats and issues will be elevated by the project manager to risks as necessary, and recorded in the PPT Risk Database.

All significant threats and issues shall be elevated at least monthly to the SSPO Manager, for consideration of entry into the ISS Risk database. Risks entered into the ISS Risk database, will be updated as required by the SSPO Manager.

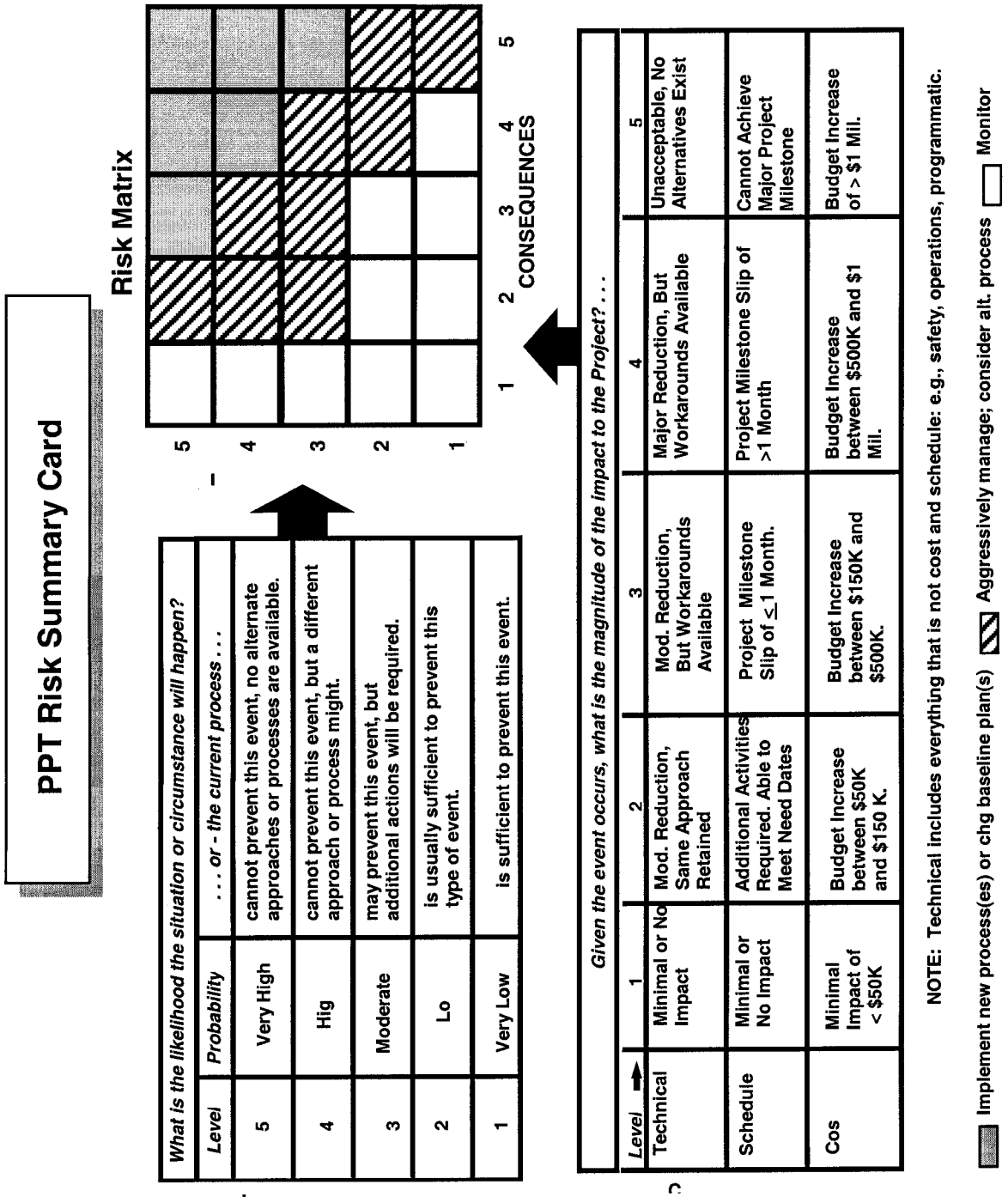
8.1 PPT Risk Tracking

All risk information shall be documented in the PPT risk database. The risk database is accessible by all NASA project personnel for the purpose of identifying new risks. Once a risk has been assigned to someone, then that person shall have the authority to update the risk information. Spreadsheet risk summaries can be printed by any PPT personnel.

9.0 RECORDS MANAGEMENT

Project risk management records will be handled in accordance with the Multiuse Payloads Group Data Management and Records Management Plan, MSFC-PLAN-3023.

APPENDIX A


PPT Risk Summary Card
Risk Matrix
5
4
3
2
1
PROBABILITY
1
2
3
4
5
CONSEQUENCES
What is the likelihood the situation or circumstance will happen?
Level
Probability
. . . or - the current process . . .
5 Very High cannot prevent this event, no alternate approaches or processes are available.
4 Hig cannot prevent this event, but a different approach or process might.
3 Moderate may prevent this event, but additional actions will be required.
2 Lo is usually sufficient to prevent this type of event.
1 Very Low is sufficient to prevent this event.
Given the event occurs, what is the magnitude of the impact to the Project? . . .
Level
1
2
3
4
5
Technical
Minimal or No Impact
Mod. Reduction, Same Approach Retained
Mod. Reduction, But Workarounds Available
Major Reduction, But Workarounds Available
Unacceptable, No Alternatives Exist
Schedule
Minimal or No Impact
Additional Activities Required. Able to Meet Need Dates
Project Milestone Slip of ≤ 1 Month.
Project Milestone Slip of >1 Month
Cannot Achieve Major Project Milestone
Cos
Minimal Impact of < $50K
Budget Increase between $50K and $150 K.
Budget Increase between $150K and $500K.
Budget Increase between $500K and $1 Mil.
Budget Increase of > $1 Mil.
NOTE: Technical includes everything that is not cost and schedule: e.g., safety, operations, programmatic.
Implement new process(es) or chg baseline plan(s)
Aggressively manage; consider alt. process
Monitor

Page 2 of 2
Risk Identification
What could keep you from achieving your objectives?
What objective is at risk?
Methods:
• Expert interview
• Analysis of project metrics
• Systematic analysis of cost and schedule reports
•Comparison of goals and plans
Key areas to assess:
•Requirements
•Technical
•Cost
•Schedule
•Manufacturing
•Supportability (Logistics & Maint.)
•Operations
•Safety
Information Sources:
• Project Metrics
• Project data
• Cost and Schedule Reports
• Suppliers
• Plans
• Proposed Changes
• Test results
Status risks monthly
•Update data in PPT Risk Database
Risk Analysis
Determine the root cause
Quantify Your Risks:
Determine likelihood of event
Determine team's consequences
•Technical (Performance, Operations, Safety)
•Cost
•Schedule
Plot risk on Risk Matrix
Enter risk & analysis data into PPT Risk Database
Risk Abatement
What can you do about a risk?
Conduct study
•Identify best solution
Develop mitigation plans
•Reduce likelihood of occurrence
•Reduce severity of consequences
•Redesign to eliminate risk
•Develop prototypes
•Modify requirements
•Acquire resources to mitigate
•Perform additional test or analysis
• Re-negotiate schedule milestones
Develop contingency plans
Accept the risk
Elevation of Risks:
•Recommend risks for elevation to higher risk managing organization.

Prepared By: MSFC RO
Note: All Times Eastern

321-861-3205
Note: Dates Subject to Review

THURSDAY
MSFC SHUTTLE REPORT FROM KSC 04/26/2001

STS100/ORBITER OV105/16 ISS-06A
On orbit. On orbit operations continue to go well. Landing is scheduled for next Monday (4/30/01) at 1000 hrs.
RSRM 79/BI107: Hydrolase operations are complete. Aft skirt removal is complete. Nozzle removal is planned for today.

STS104/ORBITER OV104/24 ISS-7A PAD B 6/14/01 1615 hrs (10 minute window)
OPF3. SSME installation is complete. Potable water servicing is in work. WCS functional is in work. WSB checkout and checkout and servicing is in work.
SSME 2056/2051/2047: 2051 installation is complete. 2056 has been installed. 2047 has been installed. Orbiter interface securing is in work.
RSRM 80/BI108: VAB HB1. S&A installations are scheduled for 4/27/01. USA GO has written a common DR to repair voids in the RTV-133 at the forward BSM closeouts.
EXTERNAL TANK (ET-109): VAB HB2W. Forward crossover installation is now on hold until 4/27/01.

STS105/ORBITER OV103/30 ISS-7A.1 PAD A 7/12/01 0445 hrs (10 minute window)
OPF Bay 2. PRSD system test is complete. Integrated hydraulic and flight control checkout is complete. APU leak and functional is in work.
SSME 2052/2044/2045: 2052 Big can leak check preps are in work. 2044 Pre-installation walkdowns and LAI installation are in work. 2045 Controller securing is inwork. Nozzle coldwall corrosion inhibitor has been applied. Hot gas leak checks are complete with 3 leaks found (G3.3, F9.1, F6.1.2). HPFTP thrust bearing R&R is complete.
RSRM 81/BI109: VAB HB 3. The RH forward segment leak checks are complete. Forward assembly mate is planned for today. PR SB-BI109L-0001 was written against the LH aft booster clevis j-joint to document an air pocket/blister in region CI2 and CI3 at 118-120 degrees. Engineering evaluation and PR disposition are in process.
EXTERNAL TANK (ET-110): VAB HB4W. Flapper valve access port closeout is in work. ET/SRB mate is scheduled for 5/10/01.

STS109/ORBITER OV102/27 HST SM 3B
OPF1. Servicing preps for Freon coolant loop #2 are in work. Avionics bays 5 and 6 black box installations are in work. WSB spray valve replacement is in work. PLBD closure in preparation for rollout to VAB HB4 is complete.

EXTERNAL TANK (ET-93) (STS-107): VAB HB2E. No activity.
EXTERNAL TANK (ET-111) (STS-108): VAB Transfer Aisle. No activity.

RSRM 82/BI110 (STS-108): RPSF. LH aft booster buildup is in work. The assembly will be moved to a transportation pallet today. RH aft booster buildup is in work.
RSRM 83/BI111 (STS-108): RPSF. LH aft segment offload is complete. The RH aft segment and the two aft exit cones are at suspect siding.

END OF REPORT